

**35M Offshore Fast
Stealth Interceptor
Technical Specification**

35M Fast Stealth Interceptor



HIGHLIGHTS

1. Designer: Lomocean Design Ltd., world reputable stealth military boat designer which has been recognized as the most cutting edge stealth military boat designer globally except in the region of Sweden and the US.
2. This 35M Fast Speed Stealth Interceptor is developed for China Customs Authority with all design packages already finished for construction and tank test already finished satisfactorily.
3. Hull material: Carbon + Kevlar + Vinyl ester + E-glass.
4. Ballistic Protection(option): side walls to reach NIJIII and windows to reach NIJIIIA.
5. Max. Speed: 52 knots at normal displacement and 1.25m wave sea condition.
6. Main Engine: 4 x MAN V2000 M94 @ 2450rpm.
7. Propulsion: 4 x ASD16.
8. Classification: CCS, RINA or any other number of IACS to be specified by user.

DESIGN PURPOSE

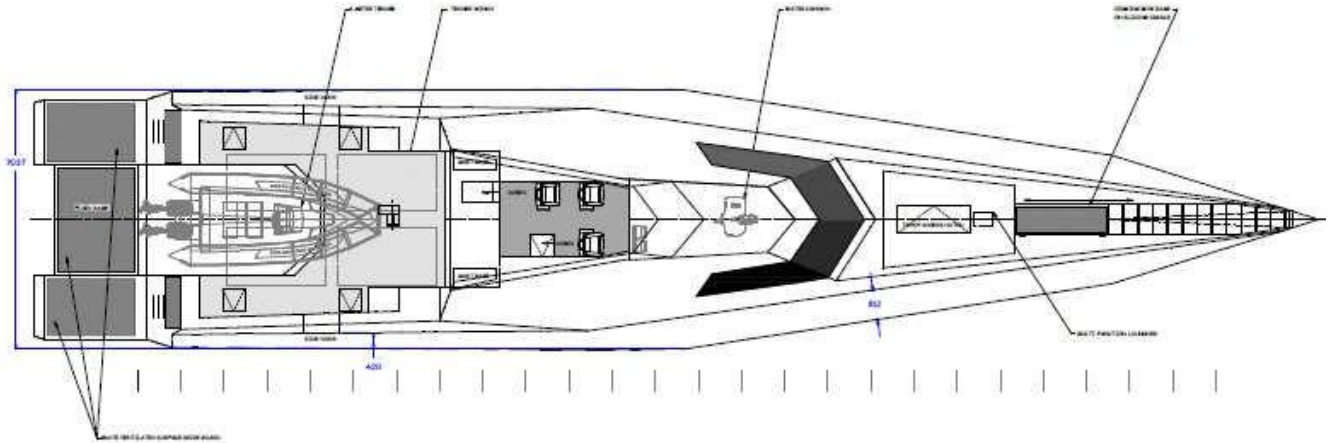
This 35M Fast Stealth Interceptor is re-designed and to be constructed to satisfy below multi-mission/purposes:

- a. Patrolling in rough sea conditions.
- b. Beaching.
- c. Landing.
- d. Disaster relief.
- e. Surveillance.
- f. Mid-range assault interception.
- g. Boarder protection.
- h. Combat operation in rough sea condition.

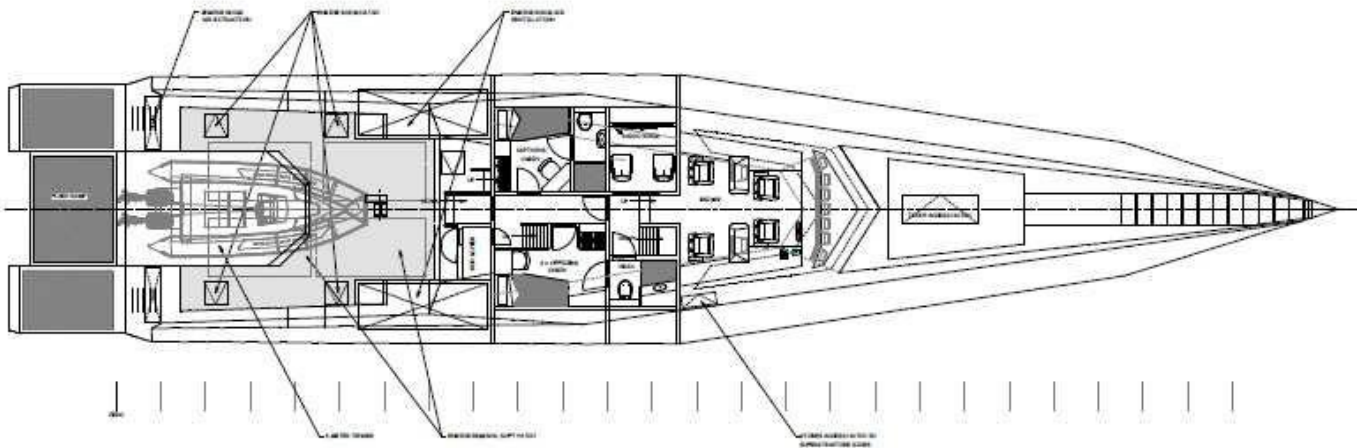
Main Data

LOA	34.80 m
Hull Length	32.00 m
Water Line Length	30.00 m
Beam	7.00 m
Height (including the removable radar mast):	7.55 m
Deadrise at stern:	19 deg.
Deadrise at midship:	21 deg.
Deadrise at bow:	23 deg.
Draft:	1.30 m
Max. Depth:	3.40 m
Max. Speed (at normal displacement):	52 knots
Main Engine:	4 x MAN V2000 M94 1939KW @ 2450rpm
Gearbox:	4 x MGX 6848 SC (2.47:1)
Propulsion:	4 x ASD16

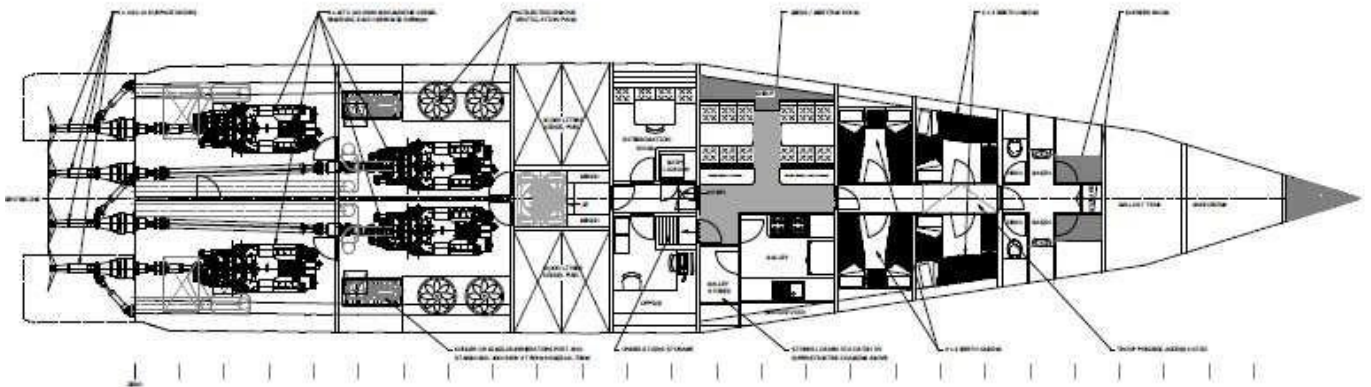
Exterior Deck Plan Arrangement



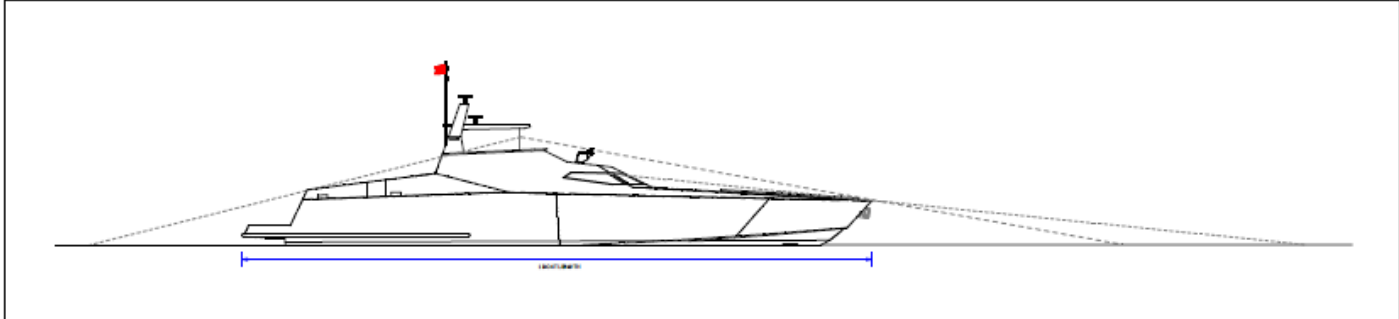
Main Deck Plan Arrangement



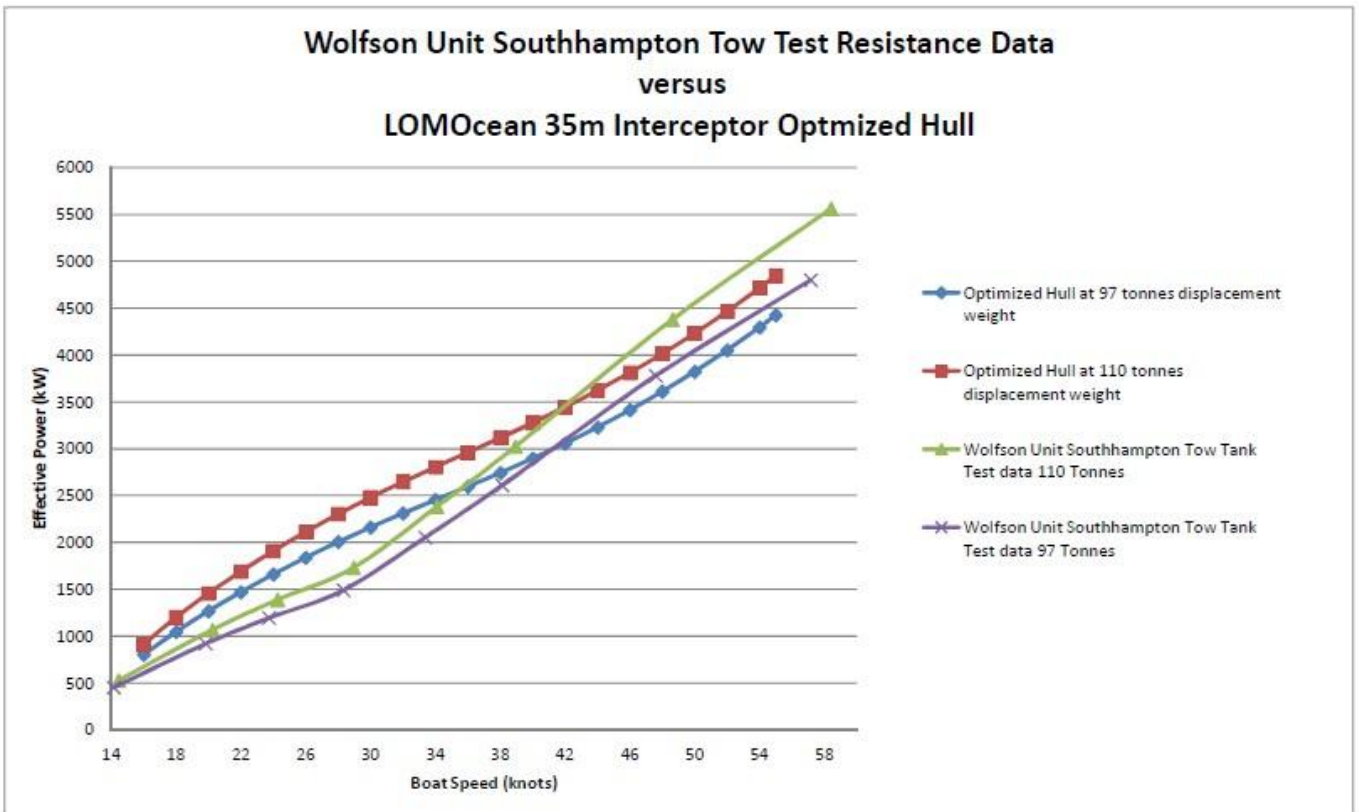
Lower Deck Plan Arrangement



35M Fast Stealth Interceptor Blind area at the Bridge



35M Fast Stealth Interceptor Tank Test Report



35M Fast Stealth Interceptor
Technical Specification

1.0 GENERAL TECHNICAL SPECIFICATION:

Vessel Type: Mono-Hull Fast Patrol Vessel with reduced RCS features

General Arrangement Document No. ARR-01

Midship Section: Document No. STR-01

Material: Advanced composite

Hull Form: High Speed Deep-vee Planing Mono-Hull

Principal Dimension:

Length Overall:	34.80m
Length on Design Waterline:	30.00m
Beam:	7.00m
Depth:	1.30m

Crew: 12

Tankage

Fuel	2 x 10,000 litres nominal
Fresh Water	1 x 3000 litres nominal
Black Water	1 x 1000 litres nominal

Max. DeadWeight

Crew and personal effects	12 @ 100kg:	1,200 kg
Fuel Main Tank 100%:		16,700 kg
Fresh Water 100% :		3,000 kg
Black Water 10%:		100 kg
Water ballast:		2,000 kg
Weapons and ammunition:		1,000 kg
Stores andspares:		1,000kg
TOTAL:		25,000 kg

Loaded Displacement: 110,500 kg

Propulsion System*

Main Engines: 4 x MTU 16V2000 M94 (1939kW @ 2450 rpm)

Gear Box: 4 x MG 6848SC (2.47:1)

Propulsion: 4 x Arneson ASD16

Electrical*

Generator: 2 x Kohler 70kW, 50 Hz
Voltage / Frequency: 400 VAC, 3 Phase, 50 Hz, 4 Wire
230 VAC, 1 Phase, 50 Hz, 3 Wire
24 V DC

Performance

Sprint: 52 Knots at 95 % max engine rating (mid load condition)
Range: 420 nautical miles at 30 Knots
Trials Conditions: <Seastate 2 / air 25°C/water 22°C/hull clean

2.1 DOCUMENTATION

2.2 Language

All Certificates, Manuals and Drawings Shall be in the English and Chinese Language

2.3 Certificates

The Following Statutory Certificates Will be Furnished:

Builder:

- Builder's certificate
- Builder's test certification for main machinery and equipment
- Radio installation license
- Compass certificate
- Main engine dynamic test (TVA)
- Certificate of test for anchor and cable
- Approved stability booklet

Classification Society:

- Classification Certificate for Hull and Machinery

2.4 Drawings

The Following Drawings will be furnished in pdf format:

- General arrangement drawing
- Construction arrangement and midship section

Engine room arrangement

3.1 STRUCTURES

3.2 Reinforcements

E-glass stitched/knitted biaxial (0/90 biaxial and +/-45 double bias) – 400, 600 and 800g/m²

Kevlar cloth – 300 g/m² woven

Carbon stitched/knitted 400 g/m² double bias and 450g/m² unidirectional

3.3 Cores

PVC in 60, 80, 100, 130 and 200 kg/m³ densities

3.4 Resins

Infusible brominated vinylester with fire retardant additive

3.5 Tanks

The two fuel tanks and the bow raw water ballast tanks shall be integral with vessel structures.

Fresh and black water tanks shall be non-integral polyethylene tanks.

3.6 Fendering

Main fendering at gunwale will be made up from a heavy section integral with the hull and deck structures, including Kevlar/aramid reinforcement.

A crash bar with grated deck fitted for crew access will be fitted to the transom to protect the surface drives during close quarters maneuvering.

A heavy Kevlar/aramid laminate at the bow and stem area will be included to offer impact and abrasion reinforcement for bow impact events.

3.7 Engine Foundations

The engine and gearbox foundations will be solidly fabricated to carry sea and machinery imposed loads

3.8 Guards/Floor Plates

Shaft guards will be fitted over the drive shafts and other moving main and auxiliary engine parts where required. Floor plates are fitted throughout the engine room where required.

3.9 Scantlings

In accordance with the construction arrangement and mid-ship section drawing detailed in the general technical specifications.

3.10 Bollards

The vessel will be fitted with V configuration bollards solidly constructed from stainless steel with solid base foundations and under-deck stiffening.

3.11 Soft Patches

Soft patches will be located in the main deck above the engines and generators.

3.12 Access Ladders

Aluminium ladders and grab handles will be fitted in way of the through deck quick release man hole deck hatches and engine room access.

Aluminium ladders will also be provided for access onto the flying bridge command station.

An Aluminium hinging bow ladder will be attached to the fore deck accessing the corridor on the lower deck. Able to be manually operated to allow passage of personnel directly to and from the foredeck.

3.13 Ma st

3.14 Personnel Control Device Mounting

The foredeck will be fitted with a multiple-purpose launcher and will be reinforced with solid base foundations and under-deck stiffening.

A water cannon intended for personnel control purposes and capable of minimum 70m range will be mounted on the wheelhouse roof and will be powered by an electrically operated sea water pump.

4.1 OUTFIT AND FINISH

4.2 General

The accommodation spaces and bridge on the vessel will be finished to a high commercial standard. Accommodation finishing materials shall be of a simple and robust nature to minimize maintenance and to facilitate ease of clearing.

4.3 Arrangement

As per the LOMOcean Design General Arrangement drawing detailed in the general technical specifications.

4.4 Ceiling

'Dampa' 2' square tiles ~ Square perforated lightweight ceiling system laid in a 90 degree square pattern with a power coated finish from a standard Dampa colour chart.

4.5 Deck Coverings

Crew Accommodation:	Wool Carpet
Crew Mess:	Non slip vinyl
Bridge:	Non slip vinyl
Access Door Entrance:	Brush Mats Inserts
Toilets:	Non slip Vinyl
Exterior Decks:	Non Skid Paint

Bulkheads and cabin sides above and below the window areas will be lined with phenolic or similar fire class decorative lining panels.

4.6 Seats

Pilothouse: 4 x CLEEMANN helm seat
Flying Bridge: 3 x CLEEMANN helm seat

The pilothouse helm seats will be leather covered with aluminium bases and flying bridge helm seats will be vinyl covered with aluminium bases as follows.



4.7 Doors and Hatches

Exterior Access:	2 x single weather tight doors
Interior Access:	18 x single doors
Interior smoke door:	1 x single door
Deck Hatches:	7 x aluminium water tight deck hatches
Watertight Doors:	5 x steel watertight doors

4.8 Door Hardware

The standard door hardware will include stainless steel latches and locks, 3 x sets of anodized aluminium hinges, automatic closers and locks to be keyed alike.

4.9 Interior Pillars

Stainless steel with a N4 finish.

4.10 Toilets

There will be four toilets as indicated on the general arrangements drawing stipulated in the general technical specifications. The toilet modules will include a standard toilet, a recessed sink in a vanity unit / mirror, toilet roll holder and a liquid soap dispenser.

There will be four shower cubicles, two located in the fwd hull (crew), one in the Captain's cabin and one serving the twin officer's cabin on the bridge deck level.

4.11 Pilothouse

e

All shipboard instruments will be fitted at the central helm station in a covered console fitted across the front of the bridge. The ship board systems and specific instrumentation are specified in section 7.

Separate communication and navigation workstations will be provided.

Four heavy duty windscreen wipers with synchronizing, wash and self parking will be fitted in the wheelhouse front windows.

Additional storage areas will be provided under the console each side of the central helm station.

Storage will also be provided for crew lifejackets.

4.12 Crew Accommodation

The crew accommodation will comprise of 10 bunks each with own reading light. A locker for each member of the crew will also be provided.

4.13 Officer Cabins

There will be two cabins for the officers (Captain / 1st Officer). Each cabin will include bunk type berth (aluminum base with fire proof mattress), a locker and desk (with chair)

4.14 CrewMess

The galley will have a work bench and storage cupboards as shown in the General Arrangement. The galley equipment will include:

- Double Bowl Sink with Hot and Cold Taps
- 4 Burner Electric Hob with Oven
- 1 x Fridge
- 1 x Freezer

Booth type lounge seating and table is provided for crew meals, relaxation and briefing.

4.15 Interrogation Room

The interrogation room will be equipped with booth seating for suspects, a table, chair and synchronous audio and video recording equipment.

4.16 Office

The ships office includes stowage and desk space for general ships administration and monitoring of Interrogation Room recording equipment.

4.17 GunLocker

The secure gun locker will be accessed from the aft deck and used to store small arms and ammunition.

4.18 RadioRoom

The radio room will house appropriate communications equipment and is located aft of the bridge. With suitable mounting arrangement for equipment and seating for operators.

4.19 Windows

Pilothouse Side 12 mm toughened safety glass

Pilothouse Front 16 mm toughened safety glass

All windows will be non-opening type, bonded to the composite structure with appropriate adhesive.

4.20 ExteriorPaint

The vessel shall be painted in accordance with the specification from a recognized paint manufacturer.

The vessel to be painted with 2 pack urethane on an epoxy undercoat. All gloss surfaces to be spray painted. Hull anti-fouling to the manufacturers specifications.

The vessel's name and other markings will be painted on the vessel as per classification society and customer requirements.

4.21 Signs

Signs for crew safety information will be fitted as required by the classification society. The vessel will be non-smoking and appropriate signs displayed to this effect.

4.22 Handrails and Walkways

316 stainless steel handrails will be fitted 1000mm above decks or 200mm atop bulwarks.

Both the stanchion and top rail will be 32mm diameter. The intermediate rails will be 25mm diameter. Internal hand rails will be 32mm diameter 316 stainless steel

5.1 VENTILATIONANDAIRCONDITIONING

5.2 EngineRoom

The engine room shall be fitted with its own mechanical ventilation supply system in accordance with engine manufacturer guidelines. The system will consist of axial inlet 400V fans and naturally ventilated exhaust.

The air intakes shall be fitted to the side of the vessel and shall be fitted with louvers and water baffles, with drainage to remove water.

The engine room ventilation shall be designed to ensure engine room temperature compliance as per the engine manufacturer's recommendations.

Special consideration shall be allocated to the ambient and water temperatures the vessel will be operating in.

5.3 Bathrooms

All bathroom / toilet spaces shall be ventilated with extractor fans exhausting through the overhead and ducted to atmosphere.

5.4 Tank and Void Spaces

Tank vents shall be led to the atmosphere to a position above the main deck. The outlets of any fuel tanks shall be fitted with anti-flash gauzes. They shall be manufactured of certified materials and positioned to the height nominated by the classification society.

5.5 Air Conditioning

The cabin and crew accommodation areas will be fully air conditioned to a total of 96,000 BTU/hr.

The air conditioning will be comprised of eight, 12,000 BTU/hr, multiple reverse cycle, marine type self contained units (Cruisair or similar) operating on AC power and exchanging heat with a raw water loop supplied by separate inlet, strainer and pump from the forward engine room.

Provision is to be made for separate passive ventilation and supply of make up air.

5.6 Thermal Insulation

Thermal insulation is considered to be integral with the foam sandwich composite structures and no additional thermal insulation is specified.

5.7 Ventilation Dampers

Ventilation dampers shall be fitted in accordance with classification society requirements.

Fire dampers for machinery space shall be manufactured from stainless steel. The fire dampers for the machinery space shall be operated locally.

6.1 ENGINEERING

6.2 Propulsion

Main Engines

The MTU brand engine model shall be as per the general technical specifications.

Gearbox

The Twin Disc brand gearbox model shall be as per the general technical specifications.

6.3 SurfaceDrives

The vessel will have Arneson surface drive propulsion as per the general technical specifications.

6.4 Shafting

Hollow steel cardan shafts with universal joints will connect each gearbox and surface drive combination.

2 x shafts to be equipped with through bulkhead water tight fittings, enabling water tight partition between engine rooms to satisfy damaged stability requirements.

6.5 Main Exhaust

Wet exhaust system with fire insulated risers, to injection elbows, with water lock mufflers. The main exhausts will exit the vessel on the outboard sides of the hull.

6.6 Auxiliary Exhaust

Wet exhaust system with water lock mufflers exiting the vessel side.

6.7 Electrical Supply

The Kohler brand generator model shall be as per the general technical specifications.

6.8 Stabiliser

A gyro stabiliser, with nominal rotation speed of 3800rpm will be installed on suitable support structure, low in the hull.

6.9 Anchor System

A 180kg galvanized high holding type main anchor with 16mm galvanized chain is to be fitted in accordance with the classification society requirements. (Plus spare anchor with chain where required under classification society requirements)

The main anchor will be stowed on a through stem fitting, attached to the windlass and be ready for use. A recessed gypsy type DC powered windlass will be installed on the centre line of the vessel, with chain locker below.

A spare anchor where required will be secured to the deck and shall be capable of being man-handled for deployment as required.

DC powered warping drums will be fitted to the foredeck and to each after stern quarter to assist with docking operations.

4 x mooring warps will also be supplied.

6.10 Cathodic Protection

Recessed anodes will be bolted to the hull as required. The protection system is to be to the satisfaction of the owner and to the requirements of a recognized specialist firm allowing for the rate of salinity in the areas of operation.

6.11 Controls/Instruments

A Twin Disc electronic control system for the engine and gearbox controls will be linked together in the pilothouse at the central helm position and at the flying bridge control station. The control heads will be single lever dual action with options for synchronizing.

Steering will be provided by wheels mounted at the central helm position and the flying bridge control station.

A main control panel will allow independent controls of each driveline, including trim of the surface drives.

Running trim of the vessel will be effected by a Humphree interceptor type tab system and the 2000 litre bow ballast tank.

The Following Machinery Instrumentation and alarms are to be displayed at the central helm position and flying bridge control station:-

- MTU Engine Management Electronic Displays
- Engine Speed
- Coolant Temperature
- Oil Pressure
- Fuel Consumption Rate
- Battery Voltage
- Transmission Oil Temperature
- Transmission Oil Pressure
- Auxiliary Engine Shutdown Alarms
- Auxiliary Power Failure Alarms

The following auxiliary engine instrumentation is to be displayed in the engine room.

- Hourmeter
- Electrical Load – Amps
- Voltage
- Frequency

6.12 NoiseandVibration

A detailed torsional vibration analysis will be undertaken to ensure machinery function compliance and minimum noise and vibration excitation.

Special consideration shall be placed on the structural design and engineering associated with the engine bearers and surface drive supporting structure. Emphasis shall be placed on the selection of structural details to minimize the onset of structural high frequency vibration excitation.

7.1 PIPING SYSTEMS

7.2 Piping

All systems shall be designed, furnished and installed in accordance with the classification society requirements.

Pipe runs will be broken up by flanges or couplings for easy removal and be kept clear of lugs. All pipes are to be marked clearly specifying their function.

Engine and generator raw water pipe work to be 2205 stainless steel.

7.3 Valves

All valve operators shall be located so as to be accessible for ease of operation and repair. All valves shall be clearly marked.

7.4 Drainage

Scuppers and drains shall be provided throughout the vessel to prevent water from accumulating and in accordance with governing authority requirements.

Limber holes shall be provided wherever necessary in the structure to assist in drainage.

Drains shall be led from the floor of the toilet areas to the black water tank.

7.5 Bilge System

8 x 230 V submersible pumps, 1 located in each void with pipe work overboard incorporating non return valves.

1 x Grundfos 220 emergency pump with flat hose. The fire pump detailed in section 7.10 will double as an emergency bilge pump.

7.6 Fuel System

Filling and venting pipes will be stainless steel. Fillers will be sealed with camlock fittings. The fuel filling will be from behind the cabin on the aft deck. Fuel gauges will be fitted in the tanks with read outs at the helm position. All fuel lines to be stainless steel sized to the engine manufacturers specifications. Manual remote fuel shut offs to be fitted. The fuel shutoffs will be activated at the engine room emergency call station. Main engine fuel filters will be remote and mounted for easy access for maintenance. Gensets will have engine mounted filters and separate fuel lines.

7.7 CoolingSystems

The main engines and generators will be seawater heat exchange cooled.

7.8 FreshWaterSystem

Fresh water tank filling and breathing pipes will be stainless steel. A 220 V pressure pump will supply outlets in the toilet vanities, showers and galley. A 200 liters hot water tank system will be installed and will supply outlets in the toilet vanities, showers and galley.

7.9 Black water System

The systems will be piped with swaged PVC Piping. All black water will be plumbed and gravity fed to the black tanks by PVC pipe work.

Tanks will be vented to the atmosphere. There will be an emergency ball valve skin fitting for each tank. Waste removal will be by camlock fittings. Black tank level alarm to be sited at the helm position.

Toilets will be salt water flushing with a 220 V pressure pump.

7.10 GreyWaterSystem

Grey water from galley, showers, hand basins and laundry will be plumbed and gravity fed directly overboard by PVC pipe work.

7.11 Hydraulic Systems

All hydraulic piping and fittings will be stainless steel. The system is to be flushed prior to commissioning.

7.12 Fire Hydrant

The System will consist of a 400 V independent fire pump located in the tank void mounted below DWL sea water intake with a butterfly valve shut of. A fire hydrant located on the aft main deck will be equipped with 1 x flake hose and nozzle. A ball valve shut off and non return valves in the pipe work at the hydrant will also be fitted. The fire pump can also be used as an emergency bilge pump for the engine room.

All fire hydrant pipe work to be stainless steel.

8.1 ELECTRICAL SYSTEM AND ELECTRONIC EQUIPMENT

8.2 General

The electrical installation and equipment shall be provided in accordance with this specification and to the requirements of the classification society for a vessel operating with unattended machinery spaces. All materials, components and devices associated with the electrical equipment shall be new, of current manufacture and suitable for marine use.

8.3 Cables and Wires

The shipbuilder shall be responsible for ensuring that cables and equipment are installed so that operation of particular equipment does not cause interference with other services. Cables terminating within consoles and similar equipment shall not be bunched and loomed together. They shall be neatly secured to cable tray or run in P.V.C. ducting so as to readily identify the route of individual cables. The voltage drop for both DC and AC circuits from the primary source to any and every point in the installation when cables are carrying maximum current under normal conditions of service is not to exceed 7% of nominal voltage. Cables for DC circuits shall be completely segregated from those of the AC circuit as far as practicable. Cables for three phase and single phase circuits will be 4-core and 3-core type respectively.

8.4 Power Source

The main power supply will be from the diesel powered alternators or from the shore connection. The alternators are to be of the self regulating brushless type of enclosed ventilated drip proof construction. Interlocked main switch will be fitted to prevent paralleling of both shore and alternator power. 24 volt DC will be supplied from the onboard batteries. An AC board will be fitted in the engine room and will contain the main circuit breaker, ammeters, frequency meter and voltmeter.

8.5 Distribution

The following systems will be required

room fans.

-230 V AC, 1 phase, 50 Hz, 4 wire system. Power

-Circuits, Air conditioning, lighting, GPOs, PA system and entertainment system.

-24 V DC circuit. Emergency lights, navigation lights, windscreen wipers, radios, radars, instruments and alarms.

Every effort is to be made to balance single phase loads so that excessive imbalance of loads on the phases is avoided. The main switch board is to be installed in the engine room and will be of front opening type. Six spare circuits will be provided on the main switchboard. The alternators are to be protected by a circuit breaker rated for overload and short circuit protection. Labels will be affixed to switches, circuits and cables.

8.6 Batteries

Six main 24 V battery banks will be fitted, one for each engine and one for each generator set. Each will consist of lithium iron phosphate batteries made into banks of sufficient capacity for engine start and DC power requirements. Radio communication sealed batteries will be fitted in wheelhouse. Emergency batteries will be fitted forward of the bridge for intermediate emergency power. Each battery bank will be charged by its own alternator and battery charger. Switching will be fitted within the engine room to provide engine starts from either battery bank.

8.7 Shore Power

50 amp outlet shall be fitted on the starboard side of the ship. A phase rotation indicator, phase sequence change over switch and main circuit breaker will be supplied for connecting the shore power

8.8 Electric Motors

Motors will be of the squirrel cage type with totally enclosed fan cooled aluminum construction, Single phase motors will not exceed 0.5 HP. Motors in excess of 1 HP are to be of the 3-phase star delta starter type. Starters, if fitted, are to be equipped with motor protection circuit breakers, over current protections and push button overload resets.

8.9 Bow Thruster

A single 24V DC bow thruster will be installed, with a nominal thrust of 350kg.

8.10 Lighting

The main cabin, crew accommodation, wheelhouse and toilet lighting will be by 24 volt DC and fitted into the deck head linings. All lighting to be of the LED down light fittings.

All on board lighting and illumination will be to the requirements of the classification society and any other local standards.

Exterior deck flood lighting will be by 230 volt AC. All voids will be lit. Red night lights will be fitted in the wheelhouse.

The wheelhouse, instrument panel lights and compass light will be fitted with dimmers.

The type and enclosures for light fittings and switches to be determined by the location of the installation.

The following navigation lights will be fitted:- Mast head, port, starboard, stern, anchor, NUC. The navigation lights will be controlled from the switch panel in the wheel house.

A selected "Police Light Bar" will be fitted to the mast.

8.11 Patrolling /Intercepting Systems

In addition to the high pressure water canon and multi purpose launcher, the following search, forensics and weapons equipment will be supplied and fitted:-

- 1 x Optical Monitoring Device. With a range not less than 2 nautical miles.
- 1 x Photoelectric Tracker
- 1 x Directional Acoustic Dispelling Device. With an effective distance of 300m
- 1 x Communication Jamming Device. With an effective range of 6000m

8.12 Navigation

The following navigation equipment will be supplied and fitted:

- 1 x Magnetic Compass
- 2 x Beidou Satellite Navigation and Positioning (Generation Two)
- 2 x Navigation Radar
- 1 x Meteorograph
- 1 x NAVTEX Receiver
- 1 x Echo Sounder
- 1 x Clock and Meteorological Station

1 x set of Navigation Sensors (Gyro, GPS and Log) Including integrated displays for supplied navigational equipment, including chart plotter and depth sounder.

1 x AIS

2 x Search Light with remote control in the bridge

1 x Electric Horn

1 x Voyage Data Recorder

8.13 Communication

The following communication equipment will be supplied and fitting.

1 x Shortwave Radio

1 x VHF Radio

1 x Communication Service Terminal

1 x Trucked Communication Device

2 x VHF wireless photo

1 x Maritime Satellite BGAN Station

1 x Portable Survival Radio Beacon

1 x Fixed Emergency Radio Beacon

1 x Movable Emergency Radio Beacon

1 Auto Calling System

8.14 Alarm System

The main alarm system will be a PLC system consisting of two servers PCs and two screens. This system will monitor all engines, tanks, bilges, hydraulics and power to Classification Society approval.

Emergency batteries discharge

Bilge alarm high level

Bilge pump operation

Navigation light fault

24 Volt battery failure

AC power failure

Fire alarm indication

Power steering failure

Black water tank high level

8.15 CrewInterco

m

There will be a crew intercom between the bridge, crew accommodation and crew mess.

8.16 CCTV

A colour flat screen monitor will be mounted at the central helm position.

Two cameras will be mounted in each engine room.

Further cameras will be mounted to the exterior of the vessel to assist with docking operations.

8.17 PA/Audio System

A 230/24 Volt public address system will be supplied and fitted consisting on the following: 1 AM/FM radio, MP3 player, amplifier, microphone, speakers in the crew accommodation, speakers in the crew mess and speakers in the aft exterior decks.

An exterior public address system (megaphone) will be supplied and fitting, including a suitable siren

8.18 TV System

There will be an integrated TV system with DVD and HDMI connection capability. 1 x 42" Flat screen TVs on the forward bulkhead in the crew mess. TV audio will be integrated into the vessel audio system.

A satellite TV receiving antenna will be mounted on the on top of the wheel house.

9.1 FIRE AND SAFETY

9.2 Fire Fighting Equipment

A 12 zone smoke and fire panel with battery back-up will be mounted in the bridge (in accordance with the alarms defined in section 7). Heat and smoke detectors will be located in accordance with the Classification Society's specifications.

There will be a fire hose and reel mounted in accordance with fire hydrant details in section 6. Portable fire extinguishers will be mounted in accordance with classification society requirements.

The main machinery spaces will be protected by independent FM200 fire extinguisher systems (or CO2 system or Aerosol fire extinguishing system). The fire smothering systems will be activated from a control station located adjacent to the forward engine access door with engine room warning strobe lights.

Electronically activated “Z” fire flaps will be incorporated into the engine room air vents and activated from the control station. Engine room air fans will have a shut down control at the control station.

9.3 Structural Fire Protection

A60 structural fire protection will be fitted to the engine room deck head, bulkheads and the hull sides to the DWL in accordance with Classification Society requirements

9.4 General Safety

The final lifesaving arrangement shall be subject to flag state approval. The vessel shall be fitted with:

- 1 x 25 person self righting liferaft (SOLAS “B” scale emergency pack) Including cradle, hardware, and hydrostatic release units.
- 4 x SOLAS Life Buoys.
- 4x SOLAS Life Lights.
- 2 x Flares red smoking.
- 105% of crew numbers of SOLAS life jackets with automatic light and whistle.
- 1 x Hand held VHF Radios.
- 1 x EPIRB.
- SOLAS Medical Kit.
- SOLAS Flares container and flares.

10.1 TRIALS

10.2 Sea Trials

The sea trials shall be undertaken to the satisfaction of the classification society. At a minimum the following tests and trials will be undertaken:

Speed Trial:	In full trial load condition.
Endurance Trial:	4 hours continuous in full trial load conditions
Maneuvering Trial:	Turning and Stopping
Generator Full Load:	2 Hours

10.3 Dockside Trials

In addition to the above, functioning tests to all equipment and machinery are to be carried out. A lightship measurement will be conducted and results used in the preparation of the stability booklet.